

EXPLORATORY BEHAVIOR OF STOCK AND INBRED ALBINO RATS

CARL D. WILLIAMS
University of Miami

Qualitative observations of highly inbred rats and ordinary stock rats suggested that the inbred rats were markedly more timid than the stock rats. Similar qualitative observations concerning differences in behavior of stock rats and rats of the Wistar strain during maze learning were reported by Yerkes (1916).

Since exploratory behavior might be influenced by characteristics such as timidity, the present experiment was designed to provide quantitative comparisons of the exploratory behavior of highly inbred rats and ordinary stock rats.

METHOD

Forty male albino rats, 88 to 129 days old, were used. The 20 stock rats came from the colony maintained by the Department of Psychology of the University of Miami. The 20 inbred rats were of the 52nd generation of brother-sister matings and came from the Cancer Research Laboratory of the University of Miami. The rats were received from the Cancer Research Laboratory about a week before the investigation began.

The apparatus consisted of an enclosed, symmetrical Y maze. The floor and sides were wood and the top was hardware cloth. Each of the three arms consisted of two units of equal length; two arms were 24-in. long while the third arm was 20-in. long; each arm was 4 $\frac{3}{8}$ -in. wide, and 5 $\frac{1}{2}$ -in. high. Both units of one arm were white; a second arm had a white inner unit and an outer unit that was white with two black stripes 2-in. wide extending across the floor and up the walls; both units of the third arm were white. Thirteen small black objects, such as a beaded chain, a toy dog, a typewriter ribbon can, were fastened along the floor and sides of the outer 12 in. of the third arm. This arm was shortened to compensate for the surface area of the objects in the arm. The surface area available for exploration was thus the same in each arm. The area of the two black stripes in the second arm was equal to the surface area of the black objects in the third arm.

The maze was centered in a 6-ft. square enclosure made by black curtains. The animals were observed through a hole in the curtains. The usual precautions for eliminating any differential effect of extramaze cues were employed. Food and water were always present in the home cages and were never present in the maze.

Each rat was free to explore the Y maze for 10 min. on each of four days. Three days separated the second and third explorations. The number of units entered with all four feet was used as the measure of exploratory behavior.

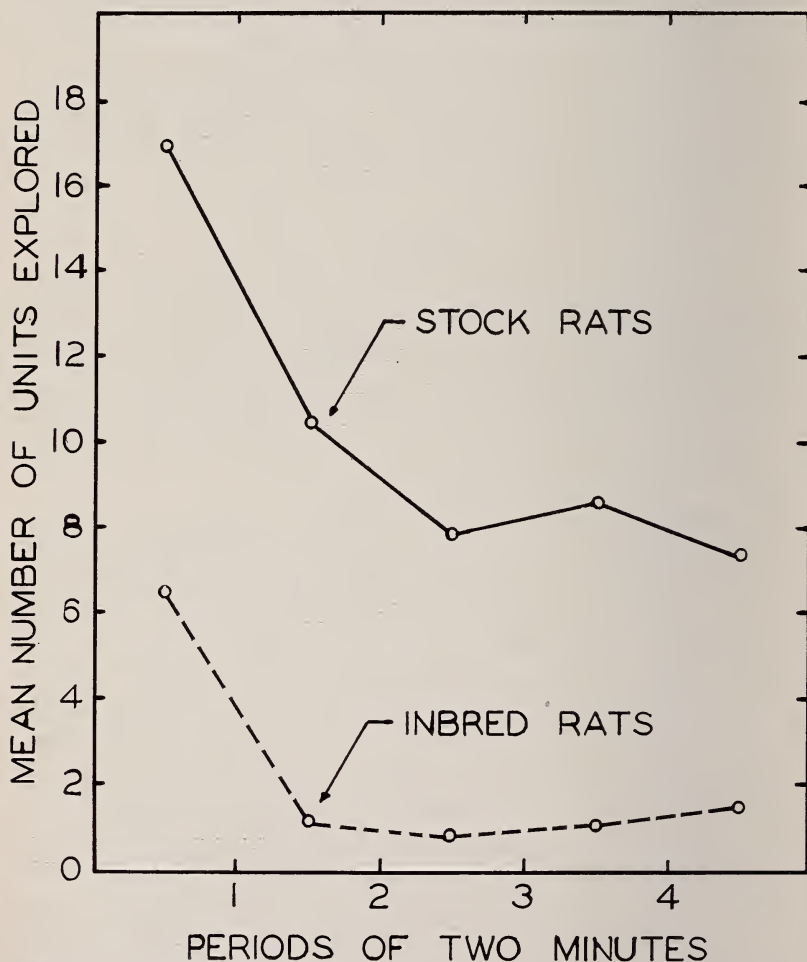


Fig. 1. Average amount of exploratory behavior as a function of time.

TABLE 1
Summary of Data for All Four Days Combined.*

	Stock Rats	Inbred Rats
Mean number of units entered	204.8	44.6
Percentage choice of three consecutive unlike arms ..	52.2%	43.8%
Percentage exploration of object arm	37.8%	49.5%
Percentage exploration of black-white arm	32.2%	29.8%
Percentage exploration of white arm	30.0%	20.7%

* All of the differences between the two groups are significant beyond the .01 level of confidence except for the % exploration of BW arm which is not significant.

RESULTS AND DISCUSSION

The major results are presented in Figure 1 and Table 1. In Figure 1, the average amount of exploratory behavior for all four days combined is plotted as a function of time in the maze. The similarity of the curves seems noteworthy. These curves are similar to the negatively accelerated curves typically found in this type of situation as shown by Montgomery (1955).

Table 1 presents for all four days combined a summary of three types of data: first, the average number of units entered; second, the percentage of times that three different arms were entered in succession, an indication of the orderliness or systematic nature of the exploratory behavior of rats in simple mazes; and third, the percentages of entry into units of each arm. In brief, the results summarized in Table 1 show that, as compared to the stock rats, the inbred rats (a) explored markedly less, (b) were less orderly in exploring the maze, (c) showed greater preference for the object arm and greater aversion for the white arm.

The quantitative results of this experiment confirm and extend the qualitative observations previously made by Yerkes (1916). They are consistent with numerous reports of behavioral characteristics and genetic determinants such as those of Lindzey (1951) and Stamm (1954). The present results seem especially related to Brody's report (1950) that inbreeding is frequently accompanied by a decrease in vigor, vitality, and fertility. It should be pointed out that the present results may not conclusively be ascribed to genetic factors, since the animals were raised in different laboratories. Further work in which environmental factors are more nearly equated is in progress.

SUMMARY

The exploratory behavior of highly inbred albino rats was compared with that of stock albino rats in a simple Y maze.

The two groups explored the maze in relation to time of exposure in a similar fashion. They differed significantly in three other dimensions of exploratory behavior.

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